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PROCESS FOR A BETA-PHASE NICKEL ALUMINIDE OVERLAY COATING

Abstract

A process for forming a beta-phase nickel aluminide (NiAl) overlay coating that is suitable for use as a bond coat for a thermal barrier coating (TBC). The overlay coating is deposited by a method that produces a generally columnar grain structure in which grains extend through the coating such that at least some grain boundaries are open at the coating surface. The coating is then peened with a particulate media, followed by heating the overlay coating to a temperature sufficient to cause the overlay coating to recrystallize and form new grain boundaries that are not open to the outer surface of the coating and significantly less susceptible to accelerated oxidation than the original grain boundaries. The particulate media is formed of a composition containing nickel and aluminum, such that an oxide scale that forms on the surface of the coating after the peening operation is substantially free of deleterious oxide compounds, notably iron-containing spinels.